

The Research on the Strategy of Infiltrating Mathematics Culture in Junior Middle School Classroom in China

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Abstract

Under the current reform of the new curriculum of mathematics education in China, more and more researchers begin to devote much attention to the role of Mathematics Culture and analyze the strategies of infiltrating Mathematics Culture in junior middle school. In recent years, there are a series of academic researches on the Mathematics Culture, but there is no summary of relevant research results. Through literature analysis, this article reviews and sorts out the researches on the strategy of infiltrating Mathematics Culture in the junior middle school classroom, and draws the following conclusions: (1) The previous researches mainly study from three aspects: how to infiltrate Mathematics Culture before class, how to infiltrate Mathematics Culture during class and how to infiltrate Mathematics Culture after class. (2) The previous researches focus on the analysis of teaching strategies during class. (3) The previous researches generally accept the following strategies: introducing the mathematical historical stories, planning life example activities to enrich the classroom. (4) Literature analysis and case study are mainly used to study the strategies of infiltrating Mathematical Culture. (5) In previous studies, there are still some shortcomings of the single research method and a lack of empirical research. Therefore, it is necessary to improve the research methods in the future and conduct research from a broader perspective to improve the research on the strategies of infiltrating Mathematics Culture in junior middle school teaching.

Keywords

Mathematics Culture, Junior Middle School Classroom, Mathematics Teaching

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1. Introduction

The Mathematics Curriculum Standard for Compulsory Education (2011 Edition) published by the Ministry of Education of the People's Republic of China indicates that it is necessary to integrate Mathematics Culture into junior middle school teaching [1]. Mathematics Culture can not only expand students' knowledge and stimulate students' interest in learning but also improve the ability of mathematical thinking [2]. Therefore, more and more researchers begin to study how to infiltrate Mathematics Culture in junior middle school, but

there is no summary of relevant research results. To understand the related research, research deficiency, and blank points, this paper intends to make a comprehensive summary of previous studies. This study can not only provide a corresponding strategic reference about infiltrating Mathematics Culture in junior middle school mathematics classrooms but also help researchers grasp the characteristics and current situation of the research to promote further research of scholars.

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The research question in this paper is "what is the research status about the infiltration strategy of Mathematics Culture in junior middle school". It includes the following specific questions: (1) What is the main research on the infiltration strategy of Mathematics Culture in junior middle school? (2) Which strategies of infiltrating Mathematics Culture are generally respected by researchers? (3) Which research methods are used to study the infiltration strategy? (4) What are the gaps in the current research on the infiltration strategies of Mathematics Culture in junior middle school?

2. Methods

2.1. Source of Information

This article adopts the literature method and uses the documents in the China National Knowledge Infrastructure (CNKI) as the data source. CNKI is the most authoritative document retrieval tool for national academic journals, which includes all the contents of journals in China. This paper chooses this database to ensure the persuasiveness and reliability of the research.

2.2. Data Collection

Using "Mathematics Culture", "junior middle school classroom" and "Infiltration" as the topic words, a total of 24 articles were retrieved. The 24 articles were closely related to the theme by reading, so all 24 articles were cited.

3. Results

3.1. Research Aspects and Categories

Through sorting out, it is found that the research on the strategy of infiltrating Mathematics Culture in junior middle school classroom mainly involves three aspects: how to infiltrate Mathematics Culture before class, how to infiltrate Mathematics Culture during class, and how to infiltrate Mathematics Culture after class. All the strategies can be divided into the following 13 categories: (1) Introducing mathematical historical stories; (2) Increasing the assessment of Mathematics Culture; (3) Planning mathematical culture and life example activities to enrich the classroom; (4) Assisting Mathematics Class with Situational Teaching; (5) Experiencing the beauty of mathematics and cultivate students' aesthetic taste; (6) Preparing lessons to create a mathematical culture atmosphere; (7) Introducing mathematical thinking; (8) Teaching students explore the charm of Mathematics Culture through self-learning; (9) Exploring the concept of teaching materials; (10) Making full use of information technology to infiltrate Mathematics Culture; (11) Using games and other teaching methods to stimulate students' interest; (12) Recommending mathematics reader after class; (13) Setting homework like arranging after-class papers. The two strategies of "introducing mathematical history stories" and "planning mathematical culture and life example activities" are the most mentioned. The specific information is shown in the following table.

Table 1. Aspects and categories.

Categories	Aspects		
	Before class	During class	After class
Introducing mathematical historical stories		17	
Increasing the assessment of Mathematics Culture			1
Planning mathematical culture and life example activities to enrich the classroom		12	
Assisting Mathematics Class with Situational Teaching		4	
Experiencing the beauty of mathematics and cultivate students' aesthetic taste		5	
Preparing lessons to create a mathematical culture atmosphere	1		
Introducing mathematical thinking		7	
Teaching students explore the charm of Mathematics Culture through self-learning		5	
Exploring the concept of teaching materials	6		
Making full use of information technology to infiltrate Mathematics Culture		3	
Using games and other teaching methods to stimulate students' interest		4	
Recommending mathematics reader after class			1
Setting homework like arranging after-class papers			4

Note: The numbers indicate the times of the corresponding strategy appears in the article.

3.2. Research Methods

Through reading 24 articles and summarizing the research methods adopted by the author, it is found that each article uses two research methods: literature analysis and case study.

3.3. Main Views

3.3.1. How to Infiltrate Mathematics Culture Before Class

The methods of infiltrating Mathematics Culture before class

mainly involve two kinds of strategies: (1) Preparing lessons to create a mathematical culture atmosphere; (2) Exploring the concept of teaching materials.

Deng points out that there is no doubt about the importance of making students prepare before class and creating an atmosphere of Mathematics Culture. Teachers should give more individualized design and guidance in this link, especially pay attention to the infiltration of Mathematics Culture. Teachers should have a proper interpretation and display of Mathematics Culture [3]. Wang, Jiang and others point out that teachers can pay attention to the words written in front of the textbook. These words are designed by the experts who write the textbook with a lot of time, which is closely related to the content of the textbook. It can be seen that these words of the mathematics textbook play a very important role in infiltrating the Mathematics Culture. That needs teachers to dig deep into the contents of teaching materials before class [4-7].

3.3.2. How to Infiltrate Mathematics Culture During Class

There are eight main strategies to infiltrate Mathematics Culture in class: (1) Introducing mathematical history stories; (2) Planning mathematical culture and life example activities to enrich the classroom; (3) Assisting Mathematics Class with Situational Teaching; (4) Experiencing the beauty of mathematics and cultivate students' aesthetic taste; (5) Introducing mathematical thinking; (6) Teaching students explore the charm of Mathematics Culture through self-learning; (7) Making full use of information technology to infiltrate Mathematics Culture; (8) Using games and other teaching methods to stimulate students' interest.

Mo and Yang point that under the background of the new curriculum reform in China, introducing mathematics history becomes one of the most concerning problems in the educational circles [8-10]. Song, Huang and others point out that mathematics knowledge comes from daily life, Mathematics Culture also comes from life, and the ultimate attention of learning mathematics is to return to daily life. Mathematics teachers should create life situations and lead students to explore mathematics knowledge from another angle [11-16].

Bai points out that Mathematics Culture is not only reflected in the long historical development but also reflected in the thought method. We know that mathematical knowledge is logical and thinking. Mathematics thought can help students understand Mathematics Culture deeper, and let students realize the rich connotation of mathematics knowledge [17-19].

Zhang, Yu and others point out that mathematics has noble beauty, and teachers should take effective measures to present

the beauty of mathematics more vividly to students. It is necessary to guide students to experience the beauty of mathematics and deepen students' understanding of Mathematics Culture [20-24].

3.3.3. How to Infiltrate Mathematics Culture After Class

The strategies of infiltrating Mathematics Culture after class mainly refer to three kinds of strategies: (1) Increasing the examination of Mathematics Culture; (2) Recommending mathematics reader after class; (3) Setting homework like arranging after-class papers.

Tao points out that the examination of Mathematics Culture should be increased. The examination of Mathematics Culture can make the examination system of mathematics less boring and enhance students' interest in mathematics examination. Moreover, the study of Mathematics Culture is also a process that needs to be adhered to for a long time [25].

Zhang points out that mathematics paper should be used to infiltrate Mathematics Culture. Mathematics teachers can encourage students to study the background of mathematics knowledge after class and tell it in the form of papers. When students collect relevant information, they can intangibly retell the history of mathematics and the ideas of mathematics scholars. It is also the students' real experience of Mathematics Culture in the form of papers [26].

4. Discussion

4.1. The Discussion of Aspects and Categories

From the above statistical results, we can find that the current researches on the infiltration strategies of Mathematics Culture in junior middle school mainly focus on three aspects, which can be divided into 13 categories. The researches mainly focus on how to infiltrate the Mathematics Culture during class. So we can find that the research on the strategy during class is more concentrated, which is the hot spot of the current research. However, there are few studies about how to infiltrate Mathematics Culture before class and how to infiltrate Mathematics Culture after class. The infiltration strategies before class are just the following two aspects: preparing lessons to create a mathematical culture atmosphere and exploring the concept of teaching materials. The infiltration strategies after class are just the following three aspects: increasing the examination of Mathematics Culture, recommending mathematics readers after class, and setting homework like arranging after-class papers. Thus, there are still some shortcomings in the infiltration strategy before class and after class.

4.2. The Discussion of Research Methods

For the research methods, all the articles use the literature method and case study. The research method is relatively single. The research originates from the reference to other people's literature or their own experience, lack of empirical verification. Researchers could provide a questionnaire to students or teachers, to understand the teaching status of Mathematics Culture more closely and deeply. The experimental method can be used to understand the effectiveness of various strategies for the infiltration of Mathematics Culture.

4.3. The Discussion of Main Strategies

Regarding the hot topic of how to infiltrate mathematics culture in the classroom, the researchers mainly summarized eight strategies. Among them, the two strategies commonly mentioned are the introduction of mathematical history stories and the planning of mathematical culture and life examples. Researchers have studied more and generally accepted these two strategies. The other six strategies are mentioned only by individual researchers and need further study.

5. Conclusion

Through the analysis of the previous research results, the following conclusions are obtained:

- (1) The research direction of this paper is how to infiltrate the Mathematics Culture in the junior middle school classroom. Through sorting out 24 articles, it is found that the infiltration strategy during class is mainly discussed.
- (2) The two strategies generally accepted by researchers are introducing mathematical historical stories and planning mathematical culture and life example activities. Researchers have studied more and generally accepted these two strategies. But the other six strategies are mentioned only by individual researchers and need further study.
- (3) The research methods mainly adopt literature analysis and case study. The use of interviews, questions, and experimentation is blank. Therefore, more research methods should be used to ensure the reliability of the results.
- (4) All kinds of strategies are studied by researchers from other people's literature or their own experience, lack of verification and persuasion. Therefore, the research should adopt various strategies in the future.

Therefore, in the future, it is necessary to further study from many angles and adopt various flexible research methods about the strategy of infiltrating Mathematics Culture in junior middle school, to find out more reasonable suggestions and measures.

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